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How can Prospective Teachers Improve their Economic Competence?

Results of an Intervention Study

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Abstract

Economic competence is a basic and central competence necessary for individual chances in life and the development of societies. However, studies show that young adults lack adequate knowledge in economics, which might be attributed to a lack in education and probably to deficits in teacher knowledge. We therefore developed and evaluated a training program in economics for prospective teachers of politics and economics. While there is an increase in knowledge, attitudes towards economic contents remain unchanged.

1 Introduction

Economic competence is considered as one of the basic and central competences necessary for individual chances in life as well as for the further development and growth of societies (e.g. Beinke 2004; Kaminski/Eggert 2008). However, various surveys have shown that particularly young adults seem to lack knowledge and to be especially prone to unfavourable economic decisions (e.g. Beck 1993; Walstad/Rebeck 2001; Hoidn/Kaminski 2006; Müller/Fürstenau/Witt 2007; Retzmann et al. 2012). Against this background, there is a growing consensus in scientific and policy discussions that the support of economic competence should become a core component of general education systems (Kaminski 2001; Beinke 2004; Dubs 2011; Retzmann et al. 2012). In accordance with this, a growing number of German federal states are adapting their school curricula and taking the development of economic competence or at least of basic economic knowledge into account nowadays.[1]

However, the implementation of economic contents in school curricula is not enough if teachers are not qualified accordingly. Since teachers' professional knowledge (as a central facet of competence) is identified as a crucial factor for successful teaching (Ball/Thames/ Phelps 2008; Hill/Ball/Schilling 2008) and moreover for student performance (Schober 1984; Weaver/Deaton/Reach 1987; Marlin 1991; Hill/Rowan/Ball 2005; Dills/ Placone 2008; Hattie 2009), the question can be raised whether teachers themselves have sufficient economic knowledge and competence to adequately support their students' learning processes in this topic. Some studies (e.g. Retzmann/Bank 2013) suggest that this is not always the case. The reason for these findings might be caused by differences in their learning opportunities. This assumption is supported by prior analyses (Siegfried, in press) which indicate that learning opportunities of prospective teachers vary substantially between German federal states and even between universities. The (partial) lack of learning opportunities and the resulting lack of knowledge is alarming since especially content knowledge (CK) but also pedagogical content knowledge (PCK) are main facets of teachers' domain-specific professional knowledge (Hill et al. 2005; Baumert/Kunter 2006). Against this background, we developed and implemented a training program for German teachers of politics and economics.

[1] Education in Germany is organised by each federal state individually. Therefore, differences in subjects and contents occur between the states. Regarding economics, these differences can be found as well. A recent development is found in the federal state of Baden-Wuerttemberg that just implemented a new subject "Economics" in 2016 (for further information see: http://www.bildungsplaene-bw.de/site/bildungsplan/get/documents/lsbw/export-pdf/ALLG/GYM/WI/bildungsplan_ALLG_GYM_WI.pdf).
Our case study focuses on economics in general education in the federal state of Hesse.

The focus of the training was on economic knowledge and on attitudes toward economics, because these are crucial facets for the development of economic competence.

In the following section, we will briefly define the construct of economic competence (2.1) and substantiate the necessity of teachers' domain-specific professional competence (2.2). We will then describe the method of our study (section 3) and present results (section 4). The paper concludes with a discussion of the results and an outlook on further research (section 5).

2 Theoretical Framework

2.1 Economic Competence

To date, there is no clear consensus on how economic competence should be defined and what dimensions and contents should be included (e.g. von der Aa 1924; Beck 1989; Salemi 2005; Tenfelde/Schlömer 2012; Schumann/Eberle 2014). In German-speaking countries, the conceptualisation of "ökonomische Bildung"[2] (Beck 1989) is a common construct. Beck criticizes the blurredness of many concepts in this domain (e.g. economic knowledge, economic competence, economic skills, economic literacy) that are sometimes used interchangeably despite different meanings and sometimes refer to nuanced differences in meaning (Beck 1989; Salemi 2005). In his approach, he analytically separates the construct of "ökonomische Bildung" into three necessary components: 1) economic knowledge and understanding, 2) economic attitudes, and 3) economy-related moral judgment (Beck, 1989). These components describe the coordinates of a three-dimensional space, which can be used to describe and measure positions or economic stances of "ökonomische Bildung" (Beck 1989). A tax evader, for example, has an excellent economic knowledge (component 1) and a high level of economic interest (component 2). Nevertheless, he cannot be described as being an economically educated citizen (high score in "ökonomische Bildung"), since he violates the norms of our society (low level of moral judgment, component 3). A citizen with a comprehensive economic education must therefore score high values along all three subscales (Beck 1989).

In the current discussion on competences in general, there is a tentative consensus on the facets of the competence construct. Following the well-established definition by Weinert

[2] "Ökonomische Bildung" or more precisely the term "Bildung" is a specific German construct and therefore difficult to translate. Bildung is a concept of education that is a lifelong process of human development, rather than the mere training of knowledge and skills.

(2001), this includes skills, knowledge, and motivational as well as volitional aspects. These facets are quite comparable to the concept of “ökonomische Bildung”, since its dimensions of knowledge, attitudes and moral judgment are similar to the defined aspects of competence. Since the term “ökonomische Bildung” is unique to German-speaking countries, the term economic competence will be used in this study. Moral judgment – the facet that is lacking in Weinert’s definition – could without doubt be added as a competence facet. Recent studies (e.g. Schumann/Eberle 2014) refer to the definition by Beck and confirm this “anatomy” of the term “ökonomische Bildung”.

Against the background of this argumentation, economic competence is defined as the knowledge and ability to decide responsibly within different restrictions such as competition or scarce resources and personal constraints (Beck/Wuttke 2005).

2.2 Teachers’ Domain-Specific Professional Knowledge as a central Facet of Teacher Competence

Competence is more than knowledge. Following Chomsky (1965) competence is a bundle of latent, not directly observable dispositions that guide behaviour. These dispositions include non-cognitive factors such as attitudes and interests. Regarding teacher competence, most competence models include non-cognitive factors such as motivation or beliefs (e.g. Baumert/Kunter 2006). However, teacher knowledge (as part of teacher competence) can be seen as a central facet. Student performance is influenced by various factors such as student characteristics and class characteristics, but especially teachers’ domain-specific professional knowledge is seen as a powerful factor (Marzano 2000; Campbell et al. 2004; Hill/Rowan/Ball 2005; Ball/Thames/Phelps 2008; Dill/Placone 2008; Hill/Ball/Schilling 2008; Hattie 2009; Lipowsky et al. 2009; Kunter et al. 2013).

In the discussion on teachers’ professional knowledge the model of Shulman (1986) is common. It differentiates professional knowledge into three components, namely content knowledge (CK), pedagogical content knowledge (PCK) and pedagogical knowledge (PK). Especially CK and PCK play a core role in developing professional competence (Bromme 2001; Ball/Thames/Phelps 2008; Hill/Ball/Schilling 2008; Krauss et al. 2008; Zlatkin-Troitschanskaia/Förster/Kuhn 2013). Within these components, studies show that PCK is dependent on CK (Baumert/Kunter 2006; Kuhn et al. 2014; Bouley et al. 2015). CK is therefore a necessary but not sufficient requirement for teaching quality (Krauss et al. 2008; Neuweg 2010). Hence, only with a well-established basis of CK can teachers react, interact

and (in consequence) build up teaching quality and successfully support students' learning (Neuweg 2010).

Despite the theoretically claimed and empirically documented significance of CK (Halim/Meerah 2002; Thanheiser 2009; Neuweg 2014), various studies show that (prospective) teachers' CK in economics is rather low (Wuttke 2008; Retzmann/Bank 2013). When looking for possible reasons for knowledge deficits, curriculum analyses at various universities show that there are striking differences in learning opportunities between universities (ranging in the state of Hesse, for example, from no compulsory modules up to three compulsory modules). A comparison of university and school curricula also reveals a gap between teaching requirements (formulated in school curricula) and the academic education of future teachers (formulated in university curricula, Siegfried, in press).

2.3 Studies regarding the Development of Economic Competence of (prospective) Teachers

In addition to the studies already mentioned above which show a rather low level of economic competence of (prospective) teachers at one measurement time (Allgood/Walstad 1999; Wuttke 2008; Retzmann/Bank 2013) some studies focus on competence development. Results show that participation in training regarding economics has a positive impact not only on the economic competence of these teachers but also on the competence of their students (Schober 1984; Weaver/Deaton/Reach 1987; Laney 1988; Marlin 1991; Allgood/Walstad 1999; Becker 2000; Dills/Placone 2008). Furthermore, Johnston and Olekalns (2002) found an improvement in students' attitudes towards macroeconomics by implementing a new learning strategy, which fosters a deep understanding, critical analyses, and problem solving within economics. These attitudes were more positive at the end of the semester and students rated the practical usefulness of the discipline higher. However, studies in Germany are rare and the results of American studies are only partly transferable to the German context due to the different qualification organisations and entry requirements within teacher education (Reinisch 2009). Nevertheless, studies generally show that an increase in learning opportunities can lead to an increase in (economic) knowledge and/or competence. Research concerning the effects of opportunities to learn on the development of teachers' domain-specific knowledge (CK and PCK) is currently growing but still scarce (Cochran-Smith, 2005; Kleickmann et al. 2013). With regard to the development of prospective teachers' CK and PCK, there is empirical evidence that CK, as well as PCK, improve during both phases of initial teacher training (e.g. Blömeke et al. 2008; Kleickmann et al. 2013; Schmelzing et al.

2013, for an overview see Fritsch et al. 2015). These findings suggest that university-based lectures and seminars on content and content-related didactics have an impact on the development of prospective teachers' CK and PCK.

2.4 Research Question and Hypothesis

Summarising the theoretical and empirical background and taking the rather low competence level of (prospective) teachers as well as their lack of learning opportunities into account, it seems promising to implement additional economics related learning opportunities for student teachers of politics and economics. These should, as a first step, support basic economic understanding (CK). As prospective teachers, these students should furthermore have the opportunity to acquire an adequate level of PCK (strategies to effectively handle economics related teaching situations) to be able to support their future students' learning processes. In this text, we focus on the development and evaluation of training in CK. The assumption is that central facets of economic competence, i.e. economic knowledge and attitudes, will increase in groups with more learning opportunities.

The Research Questions are:

1. Does economic knowledge increase in groups with more learning opportunities (compared to a control group)?
2. Is there a change in attitudes towards economic contents along with an increase in economic knowledge?

3 Method

3.1 Research Design

Based on curriculum analyses, we developed a teacher-training program adapted to the requirements of the school curriculum for the subject of politics and economics as it is taught in the federal state of Hesse (Siegfried, in press). The training aims to provide the necessary basics of economic knowledge (e.g. Armento 1987; Buckles 1987; Becker 2000) and to foster positive attitudes towards economics. It is organised as a regular optional seminar (Basic Economic Knowledge) at the Goethe-University in Frankfurt. The training that provided the data for this study comprised 14 sessions of 90 minutes each over a period of 14 weeks. The sessions covered testing, instructions and the presentation of economic teaching materials prepared by the participants at home in order to secure the transferability of the contents taught in the seminar into teaching lessons (see Table 1).

SESSION	CONTENT
1	**Kick-off and Presentation of the Concept: Curriculum Analysis with topic selection by the students**
2	**Pre-Test**
3	**Basic Concepts and Social Market Economy** *Description and explanation of central terms in economics* *→ economic principle, types of goods, shortages, efficiency, productivity, scarcity, opportunity costs* *What is the social market economy? What are the objectives of the social market economy?*
4	**Economic Cycle (Household)** *Needs and demand, individual demands, total demand (fundamentals of action), demand elasticity*
5	**Economic Cycle (Companies)** *What is supply? How does supply arise and develop? What factors determine supply?* *→ form of organisations, market forms, business processes, price development*
6	**Economic Cycle (Interaction of Supply and Demand)** *How do supply and demand interact? How does the interaction of supply and demand create a market?* *→ labour market, goods market, capital market*
7	**Economic Cycle (Government)** *→ welfare state, taxation, economic cycle, influence on the economy through actions by the government*
8	**Cash Flow EU (Monetary Policy) and Globalisation** *→ import, export, deflation, inflation, monetary circulation in the economic cycle, M1, M2, M3, monetary policy, global finance*
9	**Environmental Policy** *→ Instruments of environmental policy, environmental sustainability* **Business Ethics** *→ utilitarianism, deontologism, morality, egoism and altruism, ultimatum game, dilemmas in the economy*
10	**Presentation of Economic Teaching Materials**
11	**Presentation of Economic Teaching Materials**
12	**Presentation of Economic Teaching Materials**
13	**Presentation of Economic Teaching Materials**
14	**Post-Test**

Table 1: Economic contents taught in the teacher-training program "Basic Economic Knowledge"

The training program was regularly announced in the course plan for student teachers studying the subject politics and economics. It contained a short overview of the contents of the program. Registration for the course was done online by the students in October 2014. This process was repeated in the following semester in April 2015. In order to show an increase in knowledge and a change in attitudes through the economic training program against other non-measurable external factors, the study was organised as an intervention study following a quasi-experimental design with an intervention group and a waiting control group. The intervention group consists of all students registered via the online system in both semesters who attended and participated voluntarily in the seminar (pre-test: N= 78, post-test: N= 66, match pre- and post-test: N= 61), whereas the control group consists of a randomised group of student teachers not registered for the training program (pre-test: N= 59, post-test: N= 41, match pre- and post-test: N= 38). Therefore, self-selection effects in the intervention group cannot be ruled out.

3.2 Instruments

To test the economic knowledge of student teachers and its potential improvement throughout the training, the intervention group and the control group were tested at the beginning and at the end of the seminar. To determine the effects of the training, it is essential to implement a quasi-experimental design and to use the same knowledge test twice (pre- and post-test; Rost 2005). Possible memory effects and a resulting improvement in the post-test have to be taken into consideration. In our study, they apparently play no major role, because results of the control group are practically the same in the pre- and post-test. Therefore, the potential improvement of the intervention group can be explained by the training, not by the memory effect. Furthermore, the students were pre-tested and post-tested with questionnaires measuring economic attitudes (see Table 2 for the instruments).

	Items	*Alpha Pre-Test*	*Alpha Post-Test*	*Author*
Test of Economic Literacy (TEL/WBT)	46	0.771	0.782	Beck et al. 1989
Attitudes Toward Economics (ATE)	14	0.828	0.911	Soper/Walstad 1983
Economic Attitude Sophistication (EAS)	14	0.715	0.719	Soper/Walstad 1983

Table 2: Overview of the instruments

To measure the dimension "economic knowledge and understanding," items of the WBT (Wirtschaftskundlicher Bildungstest) (Beck et al. 1998), the German version of the TEL (Test of Economic Literacy; Soper/Walstad 1987), were used. The WBT consists of 46 multiple choice items with three distractors and one correct answer. Each correctly solved item scores one point, the maximum number of points to be achieved is 46. Items are assigned to four subscales representing four basic concepts of economic knowledge, namely fundamentals, microeconomics, macroeconomics, and international relations.[3] The internal consistency is satisfactory (pre-test .771, post-test .782). Moreover, the WBT addresses topics that are consistent with what is required in general education curricula (Siegfried, in press). Therefore the test is well suited to answer research question one.

In order to analyse economic attitudes, the German versions of the ATE (Attitudes Toward Economics) and EAS (Economic Attitude Sophistication), both by Soper and Walstad (1983) and translated by Beck et al. (1998), were used. Whereas the ATE measures the engagement in economics as well as the engagement to address economics and economic contents (e.g. "I use economic concepts to analyse situations"), the EAS asks for agreement with concepts from economic theory (e.g. "governments should control the price of gasoline"). More precisely, the EAS measures to what extent students are in line with the current and widespread state of knowledge regarding economic concepts of economic professions (Soper/Walstad 1983, 6). Both instruments comprise 14 items, each of them using a 5-point Likert scale (1 = totally agree, 5 = totally disagree). The internal consistency of both tests is satisfactory to good (pre-test: ATE: alpha = 0.828; EAS: alpha = 0.715, post-test: ATE: alpha = 0.911, EAS: alpha = 0.719).

Furthermore, the students answered several questions regarding their background characteristics such as gender, age, current semester at the university and possible experiences in economics within their academic or previous career in order to control possible effects of prior knowledge. Both groups were pre-tested and post-tested with these instruments.

3.3 Sample

The participants were teacher students of politics and economics at Goethe University Frankfurt. Their median age is between 23 and 24 and they had attended on average one economic seminar before participating in the study. However, frequency distribution shows

[3] Furthermore, the items can be assigned to the knowledge taxonomy developed by Bloom (1956), which means in particular knowledge, comprehension, application, analysis, synthesis, and evaluation (with synthesis being omitted in the construction of the WBT; Beck et al. 1998, 18).

that the majority of the participants in both groups had attended no economic seminar at all (intervention group: 0 seminars N = 30, 1 seminar N = 10, 2 seminars N = 11, 3 seminars N = 6, 4 seminars N = 1, 5 seminars N = 1, 9 seminars N = 1; without data N = 1; control group: 0 seminars N = 26, 1 seminar N = 4, 2 seminars N = 3, 3 seminars N = 1, 4 seminars N = 1, 5 seminars N = 1, 6 seminars N = 1, 9 seminars N = 1). Hence, possible effects due to prior knowledge do not play a major role. The participating student teachers were enrolled (on average) for the 4th semester, putting them in the second third of their study program. The gender distribution in both groups was nearly balanced; in both groups, however, females exceeded males with a percentage of 59 % and 63 % respectively (see Table 3).

Group	*N*	*Female*	*Male*	*Age (median)*	*Semester*	*Attended Economic Seminars*
Intervention Group	61	36	24	23-24	M = 4.52 (SD = 2.46)	M = 1.13 (SD = 1.61)
(Waiting-) Control Group	38	24	13	23-24	M = 4.29 (SD = 2.7)	M = 0.86 (SD = 1.9)
Total	99	60	37	23-24	M = 4.43 (SD = 2.54)	M = 1.03 (SD = 1.72)

Table 3: Overview of the characteristics of the sample

4 Results of the Intervention

The data was analysed with IBM SPSS Statistics 22. In a first step, the total score for the WBT was calculated for every participant. Items left blank were counted as wrong (Bühl 2006)[4]. Furthermore, each knowledge test was checked with respect to significant incompleteness. Participants who only answered items in one of the subscales or only answered the first question in each subscale were excluded. As a result, two tests had to be discarded, one from each group.

Economic knowledge:

To determine the level of knowledge, the possible differences between the groups and the first indications regarding an improvement within the intervention group, the average WBT

[4] We are aware that there might be a bias in this procedure, because we cannot be completely sure if the participants did not know how to answer an item or were not motivated enough to answer all items.

score for both groups and both measurements (pre and post) was calculated. Results are summarised in Table 4.

Group		*M*	*SD*	*Minimum*	*Maximum*
Intervention Group	Pre	26.05	6.49	9	41
	Post	28.59	5.69	12	40
(Waiting-) Control Group	Pre	22.29	6.24	13	38
	Post	21.34	6.88	9	36

Table 4: Overview of pre- and post-test results in the WBT

In order to assess the training's impact, an analysis of variance with repeated measurement was calculated. The results show a significant impact of the training with 14 % explained variance, which indicates a high effect (Sedlmeier/Renkewitz, 2008) (*interaction effect within subjects*: F (1,97) = 15.747, $p < .001$, $\eta^2 = .140$; *between subjects*: F (1,97) = 20.288, $p < .001$, $\eta^2 = .173$) (see Figure 1).

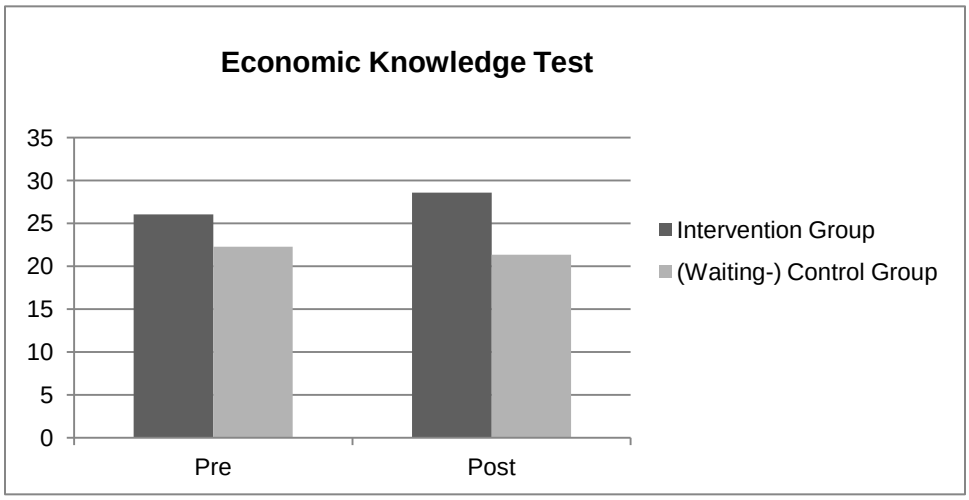

Figure 1: Change in economic knowledge between pre- and post-test

Regarding the four subscales of the WBT, the results show that the overall significant improvement of the intervention group can be found in each of the content areas with an explained variance of about 5 % (*interaction effect within subjects* for fundamentals: F (1,97) = 5.449, $p = .022$, $\eta^2 = .053$, microeconomics: F (1,97) = 4.855, p = .03, $\eta^2 = .048$; macroeconomics: F (1,97) = 5.672, $p = .019$, $\eta^2 = .055$, international relations: F (1,98) = 5.647,

p = .019, η^2 = .056). The minimal decrease of the control group (pre-test 22.29, post-test 21.34) is not significant and can be considered as random fluctuation.

Attitudes towards economics and economic attitude sophistication:

Eight items in the ATE and two items in the EAS have to be reverse-coded (Soper/Walstad 1983), so that a maximum of five can be reached in each item. Regarding the ATE, a high score equals a high engagement in economics, whereas a high score in the EAS equals a high agreement with the views of economic experts.

Tables 5 and 6 present the average score as well as the standard deviation and the minimum and maximum score for the ATE and EAS for the intervention and the control group separately.

Group		*M*	*SD*	*Minimum*	*Maximum*
Intervention Group	Pre	3.64	.56	2.21	4.79
	Post	3.71	.61	2	4.71
(Waiting-) Control Group	Pre	3.43	.61	2.29	1.86
	Post	3.35	.69	5	4.71

Table 5: Overview of the pre- and post-test results of the ATE

Group		*M*	*SD*	*Minimum*	*Maximum*
Intervention Group	Pre	3.68	.41	2.85	4.5
	Post	3.65	.49	1.71	4.43
(Waiting-) Control Group	Pre	3.41	.46	2.36	4.5
	Post	3.41	.43	2.64	4.64

Table 6: Overview of the pre- and post-test results of the EAS

There is no statistically significant difference in attitudes towards economics based on the training (*interaction effect within subjects*: F (1,96) = 2.988, p = .087, η^2 = .03, see Figure 2; *between subjects*: F (1,96) = 5.657, p = .019, η^2 = .056). Similar results have been found with economic attitude sophistication (*interaction effect within subjects*: F (1,95) = 0.227, p = .635, η^2 = .002; *between subjects*: F (1,95) = 11.807, p = .001, η^2 = .111) (see also Figure 3).

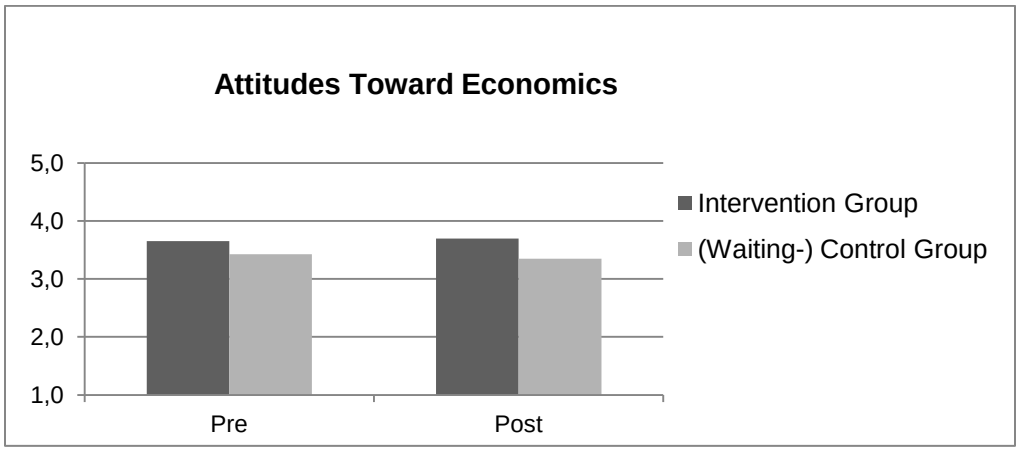

Figure 2: Attitudes toward economics in pre- and post-test

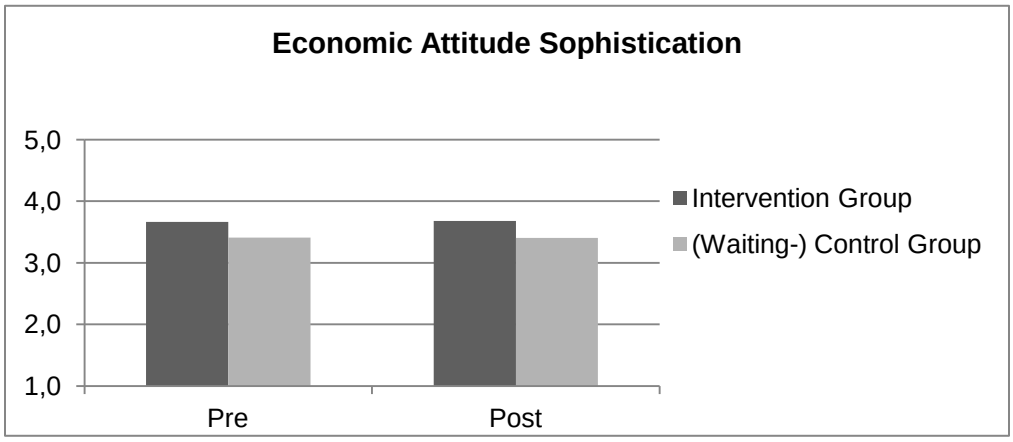

Figure 3: Economic attitude sophistication between pre- and post-test

Several studies found background characteristics such as gender, age and attitudes towards economics to be important variables when estimating economic competence (McKenzie 1970; Dawson 1977; Lüdecke-Plümer/Sczesny 1998; Brückner et al. 2015). In a first step, we calculated correlations between these variables, which confirm that economic knowledge is significantly related to gender and age (see Table 7).

	Gender	***Age***	***ATE_ Pre-test***	***ATE_ Post-test***	***EAS_ Pre-test***	***EAS_ Post-test***
WBT_Score_Pre-test	.260*	.275**	.572**	.516**	.473**	.453**
WBT_Score_Post-test	.228*	.257*	.464**	.450**	.403**	.454**

*Notes. * Significant at the .05 level; ** Significant at the .01 level*

Table 7: Correlation between the WBT, gender, age, ATE, and EAS

To allow deeper analyses and outline relevant independent variables (predictors) predicting economic knowledge, a regression analysis with a stepwise reduction of variables was used in a second step. Table 8 shows the results of three alternative models to predict economic knowledge. Including all variables in the model (model 1), it describes 37.7 % of variance. As expected based on the literature, the connection between economic knowledge and gender (β = -.127) shows that male students answer more questions correctly than female students do, however, the variable gender is not significant. On the other hand, age (β = .180), as well as ATE (β = .425) and EAS (β = .169), have a positive coefficient and play a significant role in predicting economic knowledge. Results shown in models 2 and 3 confirm that gender is not a predictor for economic knowledge and that the influence of age can be neglected in favour of attitudes (ATE and EAS). Thus, the aforementioned variables explain 37 % of variance of economic knowledge in model 3.

	Model 1 (WBT)			***Model 2 (WBT)***			***Model 3 (WBT)***		
Predictor	***B***	*SE B*	*β*	***B***	*SE B*	*β*	***B***	*SE B*	*β*
Constant	-1.129	5.154		-6.433	4.518		-5.661	4.425	
Gender	-1.677	1.108	-.127						
Age	.726**	.345	.180	.684**	.344	.167			
ATE Pre-test	4.684***	1.076	.425	4.776***	1.073	.425	5.196***	1.053	.468
EAS Pre-test	2.535*	1.440	.169	3.211**	1.377	.219	3.346**	1.389	.229
R^2		.377			.372			.370	

*Notes. * Significant at the .1 level, ** Significant at the .05 level; *** Significant at the .01 level*

Table 8: Linear regression to predict economic knowledge

In accordance with the literature, particularly economic knowledge and economic attitudes correlate positively (Paden/Moyer 1977; Ramsett et al. 1973; Soper/Walstad 1983; Beck 1989). Hence, by going into detail and to figure out to what extent this correlation between attitudes and knowledge effects the improvement in economic knowledge, a second regression analysis was calculated. The difference between the score in the economic knowledge pre-test and post-test was used as a dependent variable and ATE and EAS as independent variables and therefore as predictors for the improvement in economic knowledge (see Table 9).

Predictor	***B***	*SE B*	*β*
Constant	3.918	3.595	
ATE Pre-test	-1.016	.855	-.142
EAS Pre-test	.180	1.129	.019

Table 9: Linear regression to predict changes in economic knowledge with R^2 = .018

The coefficient of determination (R^2 = .018) within this regression model demonstrates that the *improvement in knowledge* can be predicted by attitudes with only 1.8 %. Moreover, more positive attitudes towards economics seem to result in a lower improvement in knowledge (*β* = -.142) whereas higher attitude sophistication results in the opposite (*β* = -.019). This can be explained by the high correlation between the two components ATE and EAS, since the regression model is not able to separate both effects adequately. To sum up: economic attitudes are a significant predictor of economic knowledge but only with a small effect.

5 Limitations, Interpretation and Conclusions

As mentioned above, the training program was conducted in order to improve participants' economic competence, whereas the test and questionnaire only provide data for economic knowledge and attitudes. Nevertheless, the WBT cannot be answered with declarative knowledge alone but also requires procedural knowledge and an understanding of the issues presented within the items (Beck/Krumm/Dubs 1998). Hence, even if the training program "only" prepared for better results in this test, this could be interpreted as an increase in economic thinking and knowledge. As argued above, content knowledge is a central facet of teacher professional knowledge that can significantly influence student competence (e.g. Schober 1984; Allgood/Walstad 1999; Rivkin/Hanushek/Kain 2005; Hill/Rowan/Ball 2005; Goldhaber/Anthony 2007; Dills/Placone 2008).

Students in the intervention group increased their economic knowledge significantly compared to students in the control group. Nevertheless, it has to be considered that there already is a statistically significant difference in prior economic knowledge (t = 4.034, p = .00), economic attitudes (t = 2.188, p = .031), and attitude sophistication (t = 2.744, p = .007) in favour of the intervention group. As participation in the seminar or training is voluntary, only student teachers interested in economics might have attended. This might have influenced the results, since interest is known to influence learning processes and learning results

(Hodgin 1984; Grimes et al. 1989; Krapp et al. 1993) and vice versa (Soper/Walstad 1980). It has to be noted that the explained variance in each subscale is rather low (about 5 %). One seminar shows promising results but seems to be not enough to substantially enhance economic knowledge.

While the training resulted in an increase in economic knowledge among the participants, no change in ATE or EAS could be identified. This can be explained by the fact that attitudes are components that are relatively stable (Beck 1993). A closer look at the items used within the attitudes questionnaires – especially in the EAS – might further explain this fact: Students were asked to what extent they agree or disagree with the views of economic professionals. Ernste et al. (2009) found out that there is a high discrepancy between the views of economic experts and non-professionals, such as our student teachers. Non-professionals mainly have naïve conceptions or misconceptions that are hard to change. For a change, a deep knowledge base is necessary (Walstad 1979, 1980). The training seminar was able to significantly increase the knowledge base but probably could not provide enough knowledge to change the misconceptions. Generally, a single course in economics might have the power to increase knowledge but not to change attitudes, as changes in attitude are generally difficult to achieve (Beck 1989).

Considering the fact that both groups are studying the subject politics and economics with the intention to teach, it is surprising that – at least before the intervention – the level of their economic knowledge is alarmingly low M = 24.52, SD = 6.61 (intervention group: M = 26.05, SD = 6.49, control group: M = 22.29, SD = 6.24) and not much above the level which their future students (young adults in general educational tracks) achieve in similar studies (M = 24.9, SD = 6.6; Beck et al. 1998). This might be because students studying politics and economics (at least in Frankfurt) can finish their studies without attending any economics related courses (Siegfried, in press).

In summary, these results clearly emphasise the necessity of learning opportunities in the academic education of prospective teachers in politics and economics.

For future studies, further facets of competence should be included in the measurement. Especially PCK as a necessary facet of teachers' professional knowledge needs to be trained and evaluated. To measure competence instead of just knowledge, different test

modes have to be implemented. Especially two options are conceivable: situational judgement tests (e.g. Bledow/Frese 2009; Kahmann 2015) or simulations, e.g. in the form of realistic computer-based scenarios (e.g. Wirth/Klieme 2003; Wuttke et al. 2015).

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